ZIRKON

D061 V – D141 V

Dry operating rotary vane vacuum pump

Translation of the original instructions

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Contents

2 Introduction

2.1 Information relating to the operating instructions

These instructions describe the handling of the dry-operating ZIRKON rotary vane compressor of the series type:

ZIRKON D061 V to D141 V

A condition for secure operation is adherence to all safety and operating instructions.

Read the operating instructions!

The operating instructions must be carefully read through before commencement of any operation! They are an integral part of the equipment and must at all times be kept in close proximity to the machinery for immediate use by the operating and maintenance personnel.

Observe the operating instructions!

The company 'briwatec GmbH' will not be held liable for workplace accidents, damage to the equipment, production losses or completion disorders that occur as a result of non-observance of the operating instructions.

Furthermore, the local accident-avoidance directions and general safety regulations in respect of the operation of machinery will apply.

The figures serve for a general understanding of the machinery and may differ somewhat from the actual construction thereof.

Components produced by other suppliers have their own safety instructions and guidelines. These must also be observed.

2.2 Limited liability

All data and directions in this introduction have been assembled with due consideration of the corresponding norms and regulations, of the state of the art as well as of our own knowledge and experience.

The company 'briwatec GmbH' will not be held liable for damages due to:

- Non-observance of the operating directions
- Misuse of equipment
- Employment of unqualified personnel
- Use of spare parts that have not been provided by the company 'briwatec GmbH'
- Arbitrary alteration of machinery components or of accessories (supply list from the company 'briwatec GmbH')

The responsibilities agreed in the supply contract, the general commercial conditions as well as the conditions of supply by the company 'briwatec GmbH' , and the regulations current at the time of signing of the contract will apply.

We reserve the right to make technical changes with a view to improving the operating conditions and further development.

2.3 Copywrite

The transfer of the operating instructions to third parties without written permission from the company 'briwatec GmbH' is prohibited.

NOTICE!

All data contained herein, texts, drawings, pictures and other illustrations are protected by copy write and are subject to commercial patent rights.

All misuse thereof is liable to prosecution!

Duplication in any type or form – even extracts – as well as the utilization and/or communication of the contents hereof are not permitted without written authorization by the company 'briwatec GmbH' .

2.4 Spare Parts

The company 'briwatec GmbH' recommends the use of original spare parts. Original spare parts possess special quality properties and provide reliable and safe functionality;

- Development of the special use of the equipment
- Manufacture in high quality and value
- 12-Months guarantee after installation or shipment (other than worn-out components) or other agreed conditions.

NOTICE!

The use of non-original spare parts can alter the properties of the equipment and put its safety at risk!

The company 'briwatec GmbH' is absolved of any liability for damage that results therefrom.

DISPOSAL!

Worn-out components (indicated in the spare parts list) are waste products.

After exchange, the worn-out components should be disposed of in accordance with the national regulations.

2.5 Servicing

For servicing queries, the company 'briwatec GmbH' can be contacted as follows:

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www.briwatec.de

For faster response to your queries, please have available the following data and information:

- Serial number
- Which activity has already been undertaken?

Service work: Prior to service works on-site, the motor has to be disconnected from the circuit by a qualified electrician so that an unforeseen start does not occur.

For servicing work, we recommend that the manufacturer or its local branch or sub-contractor be engaged, especially where possible repairs under warranty are involved.

The address of the servicing station appropriate for yourselves can be obtained from the manufacturer (see the manufacturer's address). Following a repair or prior to re-start-up, the jobs indicated under "Installation" and "Commissioning" must be carried out as for the initial start-up procedure.

2.6 EC-Declaration of Conformity

briwatec GmbH
Schönauer Str. 62
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Konformitätserklärung
EC declaration of conformity

im Sinne der EG-Maschinenrichtlinie 2006/42/EG
as defined by machinery directive 2006/42/EG

Hiermit erklären wir, dass die **Drehschieber-Vakuumpumpen (ZIRKON V)**
Herewith we declare that the **rotary vane vacuum pumps (ZIRKON V)**

ZIRKON D061 V, ZIRKON D081 V, ZIRKON D101 V, ZIRKON D141 V

folgenden einschlägigen Bestimmungen entsprechen:
the following special regulations correspond to them:

- Maschinenrichtlinie 2006/42/EG i.d. aktuellen Fassung/ in the actual version
- Niederspannungsrichtlinie 2014/35/EU i.d. aktuellen Fassung/in the actual version

Angewendete harmonisierte Normen, insbesondere:
Applied harmonized standards, in particular:

- DIN EN 1012-1:2010; DIN EN 1012-2:2011
- DIN EN ISO 12100-1, DIN EN ISO 12100-2

Diese Konformitätserklärung verliert ihre Gültigkeit, wenn an der Maschine Änderungen vorgenommen werden, die nicht vorher mit uns abgestimmt und schriftlich genehmigt wurde.
If some changes on the machine will be done without approval by supplier, this EC declaration of conformity will loose it's validity.

Dokumentations-bevollmächtigter
Markus Britsche
Schönauer Str. 62
79669 Zell im Wiesental/Germany

Zell i.W., den 14. August 2020
(Ort, Datum der Ausstellung/date)

Markus Britsche (Geschäftsführer/Managing Director)
(Unterschrift/signature)*

* rechtsverbindlich; mit Angaben zum Unterzeichner / legally binding; with declaration to the signer

K_0052 Rev.0

Figure 1 CE-Declaration of Conformity

3 Safety

3.1 General

The ZIRKON rotary vane vacuum pump has been constructed, completed and tested in accordance with the safety guidelines of the latest state of the art, and has been released in a technically safe and impeccable condition. Nevertheless, dangers can occur with use of the machinery, for persons and objects, if it is used in an improper manner.

The operating instructions must be read comprehensively and the safety directions must be adhered to.

The operating directions that are attached to the machinery must be followed and must be kept in a readily readable condition. This relates, for example, to:

- Connection indicator
- Data and motor identification plate
- Instructions and warning plates

In the event of non-conforming operation, all liabilities and warranties on the part of the company briwatec GmbH are rescinded.

3.2 Description of safety instructions

Safety instructions refer to particular dangers. These are indicated in this guide book by way of symbols.

SAFE refers to 4 basics in the description of the safety instructions:

- Severity of danger (Signal word)
- Type and origin of the danger (description)
- Consequence of non-observance
- Avoidance (measures to avoid a danger)

The corresponding warning symbol serves to identify the point of danger.

Model construction of safety directions:

DANGER!

Description of the type and origin of the danger!

- Measures taken to avoid the danger

3.3 General safety instructions

The following general safety instructions are used according to the type of danger:

DANGER!

Refers to an immediate, dangerous situation that results in death or serious injury if not avoided.

WARNING!

Refers to a possibly dangerous situation that could lead to death or serious injury, if not avoided.

CAUTION!

Refers to a possibly dangerous situation that could lead to slight or minor injury or to damage of objects if not avoided.

The following indicators are used in this guide book:

INDICATOR!

This symbol refers to an important state of affairs.

Relevant instructions for the installation, operation or maintenance are provided.

RECYCLING!

This symbol refers to relevant instructions for disposal.

Materials must be separated and disposed of individually.

Similarly, the instructions for the disposal of lubricants (oils and greases) as well as of additives must be observed!

3.4 Personnel Requirements

WARNING!

Danger from inadequately qualified personnel

Inappropriate actions can lead to serious personnel injury and material damage. Therefore:

- All operations must be permitted to be undertaken only by qualified personnel!

Electrical installations

Work with electrical installations may only be undertaken by expert electricians in accordance with electro-technical regulations.
This refers to work on the installation, operation, repair to and maintenance of electrical equipment.

Operation of the machinery

Operation of the machinery may only be undertaken by trained or instructed personnel. The operator must be conversant with the basic directions regarding safety at work and accident avoidance, and must have been trained in the management of the machinery. The operator must have read and understood the operating instructions prior to start-up of the machinery.

3.5 Definitions

Trained persons / operators … trained Personnel/Operators have been trained by the operator in regard to the tasks given to him and the possible dangers from inappropriate actions.

Skilled personnel … qualified Personnel because of their technical training, knowledge and experience as well as their knowledge of the appropriate directions, are capable of carrying out the tasks given to them and able to identify dangers and how to avoid them.

Machinery ... connection-ready combination of the pump housing, rotor and motor.

Motor ... driving motor of the vacuum pump.

Vacuum pump … machine for generating an under pressure (vacuum).

Suction power … volume flow of a vacuum pump in relation to the condition in the suction connection.

Final pressure (absolute) … the maximum vacuum that a pump achieves with a closed suction opening, indicated as absolute pressure.

Permanent vacuum ... the vacuum or suction pressure area, which operates the pump in continuous operation. The permanent vacuum and suction pressure is ≥ than the final vacuum and < than atmospheric pressure.

Noise emission … the given noise at any particular load condition as numerical value, the noise level in dB(A) in accordance with EN ISO 3744.

3.6 Prescribed Operation

The ZIRKON V series machines are suitable for evacuation of closed systems, or for a permanent vacuum in the intake pressure range 120 to 1000 mbar (abs). These dry operating vacuum pumps are suitable for pumping air with a relative humidity of 30 to 90%.

The machine may only be operated in the following manner:

- Only when the machine is operated in a technically faultless condition.
- When the machine is not in a partially assembled condition.
- When the machine is in an ambient temperature and suction temperature between 5°and 40℃. At temperatures outside this range please refer to the supplier.

The machine can be used in the following media:

- Air having a relative humidity of 30% to a maximum of 90%,
- Dry, non-aggressive gases.

WARNING!

Danger when used in non-prescribed manner!

Any use of the machinery that is outside and/or alternative to the prescribed manner can lead to dangerous situations.

- ZIRKON rotary vane vacuum pumps must only be used as intended.
- All instructions in the operating manual should be strictly adhered to.

Claims of any kind in respect of damage due to non-prescribed use are not permitted. The operator alone is liable for damage due to non-prescribed use.

3.7 Non-prescribed operations

Mis-usage can result from the following methods of operation:

- No dangerous substances may be sucked into the machine such, for example, as:
  - combustible or explosive gases or fumes,
  - steam,
  - aggressive gasses.
- The use of the machine in non-industrial establishments, in which the necessary precautions and safety measures have not been undertaken.
- The installation in explosion-prone environments.
- Alterations to the machinery and its component accessories.

3.8 Safety measures by the operator/user

The machine is operated in commercial/industrial situations. The operator of the machine is, therefore, subject to the legal requirements in respect of working safety. In addition to the safety regulations stated in this operating manual, the applicable safety-, accident- and environmental protection regulations must be adhered to for operation of this machinery.

In this regard, it should be specially noted that:

- Hot parts of the machine must not be accessible or be provided with protective contact means.
- Personnel should not be placed in danger from free suction or expulsion of medium substances.
- Danger from electrical energy should be prevented.
- The operator must be conversant with the relevant protection-at-work regulations and must ascertain any situation judged to comprise dangerous conditions when the work-place of the machinery will have special safety regulations. These should be available to him as operating instructions for using the machinery.
- The operator must undertake tests throughout the operation of the machinery to check whether the operating instruction being followed by him actually conform to the prescribed instructions for operating the machinery and, if necessary, modify accordingly.
- The operator must clearly regulate and establish the adequacy of the installation, operation, fault removal and maintenance.
- The operator must ensure that all co-workers involved in operation of the machinery have read and understand these operating instructions. In addition, he must subject the personnel to training sessions at regular intervals and keep them informed about dangers.

DANGER!

Safe access to the operating components!

If operating components are displaced and unreachable, there is the risk of injury and life-threatening injury.

- Operating components should not be displaced and safe access should be available.

In addition, the operator is responsible for ensuring that the machinery is permanently in a faultless technical condition.

4 Technical data

4.1 Model (type) plate

The model plate contains the relevant technical information about the machine**.**

In the event of technical service queries the model references, date of manufacture and serial number must be available.

Figure 2 Type plate (example)

The highest permitted flow volume and vacuum are dependent upon the size of construction and are indicated on the model plate.

4.2 Technical Information

The following technical details and noise emissions apply to the ZIRKON V series:

ZIRKON		D061V	D081V	D101V	D141V
Noise level	50Hz	70	72	73	76
(max.) dB(A)	60Hz	72	74	75	78
Weight	3~				
(max.) kg		66	71	87	95
Length	mm	695	725	820	820
Width	mm	365	365	365	365
Height	mm	385	385	385	385

Figure 3 ZIRKON V series, Technical Information

The flow volume with free passage comprises 60, 80, 100 and 140 m^3/h at 50Hz operation. The dependence of the pumping capacity of the inlet pressure is shown on the corresponding data sheets.

The noise pressure level or noise production level according to EN ISO 3744, measured at 1 m intervals at one operating position at about 2/3 of the permitted total pressure differential and connected lines without vacuum reduction, are given in the table of figure 3 as having a tolerance of ±3 dB(A).

Hearing protection ! To prevent hearing damage through lengthy presence in the vicinity of an operating machine, the use of hearing protection means is recommended.

5 Operating procedures

5.1 Start-up conditions

The ZIRKON rotary vane vacuum pumps are intended for use in the commercial sector, i.e. the safety arrangements conform to DIN EN ISO 13857 for persons aged from 14 years

They are suitable for the transport of air having a relative humidity of 30% to a maximum of 90% and of dry, non-aggressive gases.

The vacuum pump can be operated in continuous vacuum in the intake pressure range of 120 to 1000 mbar (abs).

Suction power, suction pressure

The dependency of the suction power on the suction pressure is type-specific and can be taken from the corresponding datasheets:

Construction series	Data page No..
ZIRKON D061 V	D401
ZIRKON D081 V	D402
ZIRKON D101 V	D403
ZIRKON D141 V	D404

Extracted substances:

The suctioned air may contain no water or other fluids. Aggressive or combustible gases and vapours may not be suctioned. No hazardous additives (e.g. combustible or explosive gases or vapours) or aggressive gases may be suctioned.

Operation in rooms with an explosion risk is not permitted.

The suction and inlet temperature must be between 5 °C and 40 °C. For temperatures outside of this range, the manufacturer should be consulted.

NOTICE!

At increased duty cycles (evenly spaced about 10 times per hour) and elevated ambient and inlet temperatures, the maximum temperature of the motor winding and the bearings is exceeded.

In the case of such conditions seek advice from the manufacturer.

In outdoor set ups, the unit must be from protected from environmental influences (e.g. by means of a shelter).

DANGER!

Unintentional stoppage or interruption:

In the case of an operation in which an unintentional stoppage of or interruption in the compressor leads to a risk of injury to personnel or damage to equipment, appropriate safety measures to the equipment must be initiated!

5.2 Construction

The ZIRKON rotary vane vacuum pump consists of the following major components:

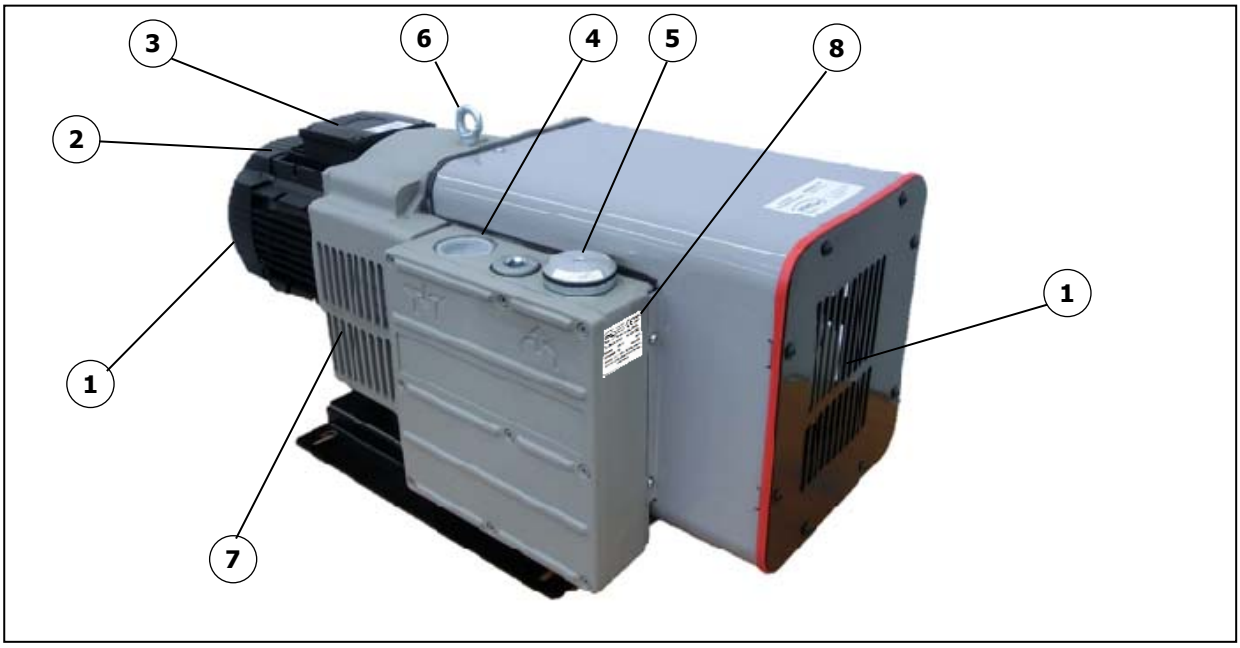

Figure 4 main components of the ZIRKON V

1. Cooling air inlet
2. Direction of rotation arrow
3. Terminal box
4. Connection for suction line (vacuum port)
5. Exhaust port / exhaust silencer
6. Lifting
7. Cooling air inlet
8. Type plate

5.3 Function

The machines of the ZIRKON construction series have a suction side and exhaust side each with a connection threading (figure 4, positions 4 and 5). The sucked air is cleaned by passing across a built-in fine filter.

The machine is encased in a sound cover made of tin. A ventilator is situated on the clutch, through which the cooling takes place.

Accessories

For the machinery types of the ZIRKON construction series the following accessories are available if required:

- Vacuum-regulating valve,
- check valve,
- motor-protection switch,
- hose connection,
- spare suction filter.

6 Transport / storage

6.1 Safety instructions during transport

DANGER!

Danger from swaying loads!

Danger of injury and injury leading to fatal injury from falling loads!

- Do not stop under swaying loads.
- Maintain sufficient distance from swaying loads.
- Be mindful of the centre of gravity.

Be aware of accident prevention regulations!

When lifting and transporting the machinery be aware of the technical safety regulations and the general accident prevention regulations as well as the accepted regulations of the state of the art.

6.2 Lifting and transporting the machinery

The machines in the series may only be suspended from the lug provided (see position 6, figure 4).

The machine may swing outwards. Be aware of the centre of gravity when lifting and follow the lifting instructions!

Packaging

The machine must be correctly packed in the original packaging prior to transporting to its destination. The package must be fixed on a euro-pallet or similar system so that the machine cannot tip over.

The packaging should protect the individual components up to their assembly, from transportation damage, corrosion and other damage. Therefore, the packaging must not be disturbed and only removed shortly before assembly.

ENVIRONMENTAL DAMAGE THROUGH DISPOSAL!

Packaging material is a valuable product and can, in many cases, be re-used or carefully prepared and re-used. Therefore:

- The packaging material must be disposed of in an environmentally friendly manner.
- The local disposal regulations should be observed; if necessary, a company qualified in disposal matters should be contracted to do so.

6.3 Storage

The machinery of the construction series ZIRKON must be stored in a dry situation that has normal air humidity

At a relative humidity above 80% it is recommended that the site is enclosed in a sealed cover containing a drying agent.

Storage for longer than a year should be avoided.

7 Commissioning

7.1 Set up

NOTICE!

All illustrated numbered components refer to the positions in the illustration of figure 4 on page 12.

During assembly and construction of the machinery care should be taken to ensure that the cold-air inlet (position 1) and the cool-air outlet (position 7) are at least 10 cm away from adjacent walls.

For de-assembly of the filter box cover, cover hood and exhaust screen, 30 cm space must be available for maintenance work.

Assembly of the ZIRKON can be undertaken on a stable and secure surface without the need for fixed footings.

For assembly on an under-construction we recommend a fixture having elastic rubber pads.

Vibration of machines of the ZIRKON construction series is minimal.

NOTICE!

For assembly at levels greater than 1000 meters above sea-level, reduced output is noticeable.

In this case, we advise prior advice from the manufacturer.

7.2 Installation

WARNING!

Mortal danger from electrical shocks!

Non-professional handling of electrical components can lead to life-threatening electric shocks, if undertaken with insufficient experience.

- Electrical installations should only be undertaken by qualified personnel.
- Fused security for the construction should be carried out via the main junction box.

ATTENTION!

Accident prevention regulations:

The current accident prevention regulations must be observed for all activities relating to installation and operation!

1. Vacuum line connection, figure 4, position 4.
   The hose must withstand a pressure of 5 kPa (absolute). The diameter of the hose should be at least the same as the diameter of the inlet flange.

NOTICE!

With too narrow and/or long conduits the output of the machine is reduced!

2. The absorbed air can be blown out by the air exhaust or led away through pipe hose and pipe connections.
3. The electrical data is indicated on the type plate (position 8) or on the motor type plate. The motors conform to DIN EN 60034 and are displayed in Safety type IP 55 and isolation class F. The corresponding connection scheme is displayed in the junction box of the motor (not present where the circuit has a plug connection). The motor data should be compared with the existing grid (current type, tension, grid frequency and permitted current strength).
   For information regarding single-phase and triple-phase alternating current as well as connection siting see below!
4. The motor and motor protection switch (for security a motor protection switch and for draught exclusion of the connecting cable a cable threading are provided).

NOTICE!

We recommend the use of motor protection switches where switching off is dependent upon a possible excess current which becomes time-delayed.

Short-term excess current can occur during a cold start of the compressor!

Triple-phase alternating current:

With triple-phase alternating current three alternating tensions are carried across five connections that have a timed relationship to one another, a so-called phased relationship.

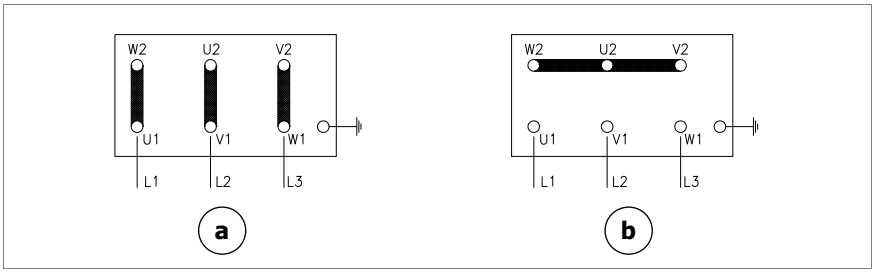

Figure 5 Connection of three-phase electrical power

a. Δ- Connection (triangular), lower tension (Example: 230 V)
b. Y – Connection (star-shaped) higher tension (Example 400 V)

Standard Tension Range	
50 Hz	**60 Hz**
220 / 380 V ± 5% 230 / 400 V ± 10%	208-230 / 460 V ± 10%

7.3 Commissioning

NOTICE!

The maximum number of starts per hour may not exceed 10!

1. The motor start-up and current direction should be checked with the arrow direction on the housing, see figure 4, position 2

CAUTION!

The pressure conduit must not be connected!

With this start-up the suction line must not be connected. With reverse flow of the vacuum pump and connected suction line, a vacuum can build up that can lead to damage to the discs and actual fracture of the discs.

2. Connect the pressure conduit at the position 4 in figure 4. Notice: if the vacuum pump is connected to the generator via a conduit in excess of 3 m in length, we recommend the inclusion of a non-return valve between the pump and the conduit. This will avoid reverse flow after shut-down.
3. Vacuum-regulating valve (option). The regulation of the vacuum is carried out by turning the regulation knob; take note of the indicated turning direction.

8 Operation

Sound emission

We recommend that in prolonged presence in the vicinity of the operating vacuum pump, the operator uses a personal hearing protection device in order to avoid permanent damage to the hearing organ.

HOT SURFACE!

Surface temperatures in excess of 70°C!

At hot operating temperatures the surface temperatures of components can rise above 70°C. Risk of burns!

- Avoid touching the components.
- Wear protective gloves.

Before start-up of the operation, the correct set up for the machine, the installation and start-up (trial run) should be organized.
See chapter 7 "Commissioning" page 14.

The machine should be checked prior to start-up in respect of observance of the service measures! See chapter 9 "Maintenance", page 18.

9 Maintenance

DANGER!

Before undertaking maintenance works:

For maintenance activities, the machine must be secured by withdrawal of the circuit plug or operation of the main switch to separate it from the E-Grid and to ensure against re-switch-on.

Pressure-conducting conduits must be purged of air before disassembly! Maintenance must not be carried out on operation-warm machinery (danger of injury through contact with hot components)!

All machines of the series have a permanent lubrication for the bearing. This must not be re-lubricated.

For maintenance operations, the discs and the filter cartridge of the air filter must be checked, see chapter 9.1 and 9.2.

For maintenance of the filter and discs the exhaust screen and casing lid must be unscrewed.

For this purpose the fixing screws must be withdrawn and the cover / lid removed.

9.1 Air Filter

NOTICE!

In the case of insufficient maintenance of the filter, the power of the vacuum pump is reduced!

The filter cartridge for the suction air, depending on the degree of contamination, should be cleaned by purging from inside to outside.

The operational readiness of the degree of separation will be reduced in spite of cleaning the filter. Therefore, we recommend replacement of the filter every half year.

Filter replacement:

Filter replacement is carried out in the following manner:

- Unscrew the filter box cover figure 6, position 3,
- the filter cartridge is withdrawn, figure 6, position 1,
- the filter cartridge is cleaned and/or exchanged,
- the re-assembly is carried out in the reverse manner.

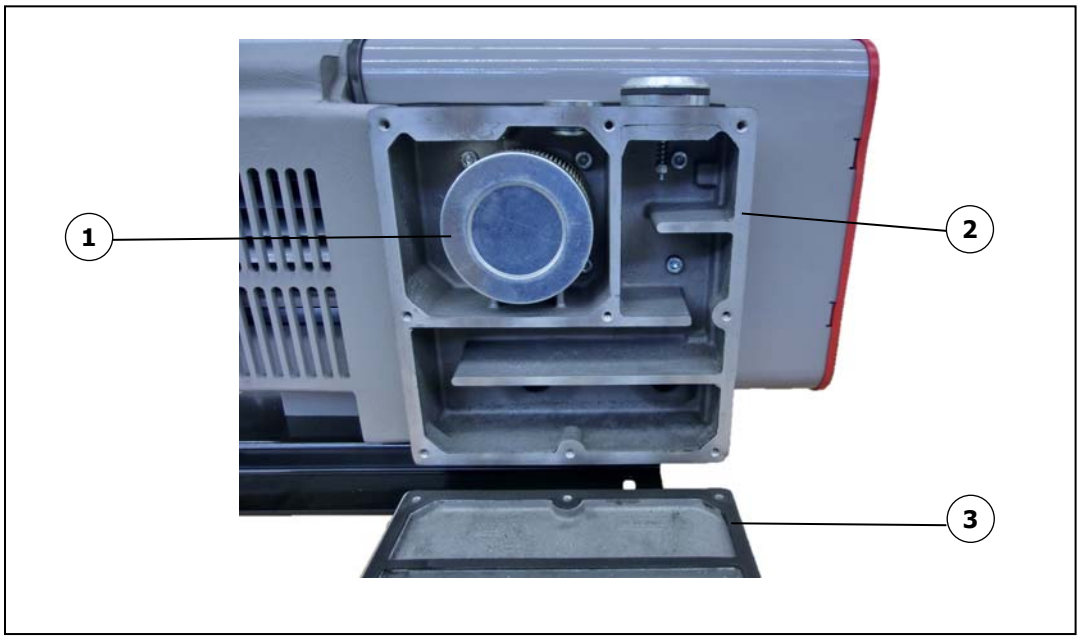

Figure 6 Air box cover, air filter

1. Filter cartridge
2. Filter box lid gasket
3. Airbox cover

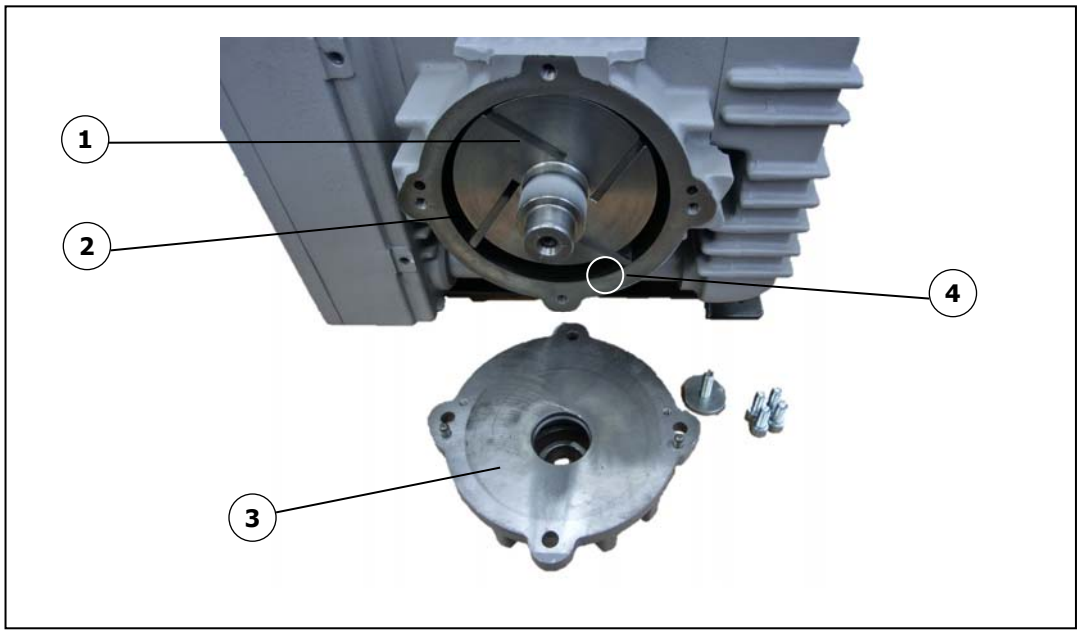

Figure 7 Open housing

1. Disc
2. Housing boring
3. Housing lid
4. Disc/housing lid

9.2 Discs

Disc control mechanism:

The machines of the construction series ZIRKON D061 V to D141 V have 4 carbon discs that wear out during operation by rubbing. In order to achieve faultless operation, the discs must be checked for wear at regular intervals.

For this purpose the discs are disassembled:

- The cover is removed,
- housing lid is unscrewed, figure 7 position 3,
- the discs are removed for checking, figure 7 position 1,
- minimum thickness and condition of the discs are checked.

The discs must have the following thickness (A):

Construction series	Minimum thickness A
ZIRKON D061 V	33 mm
ZIRKON D081 V	33 mm
ZIRKON D101 V	34 mm
ZIRKON D141 V	34 mm

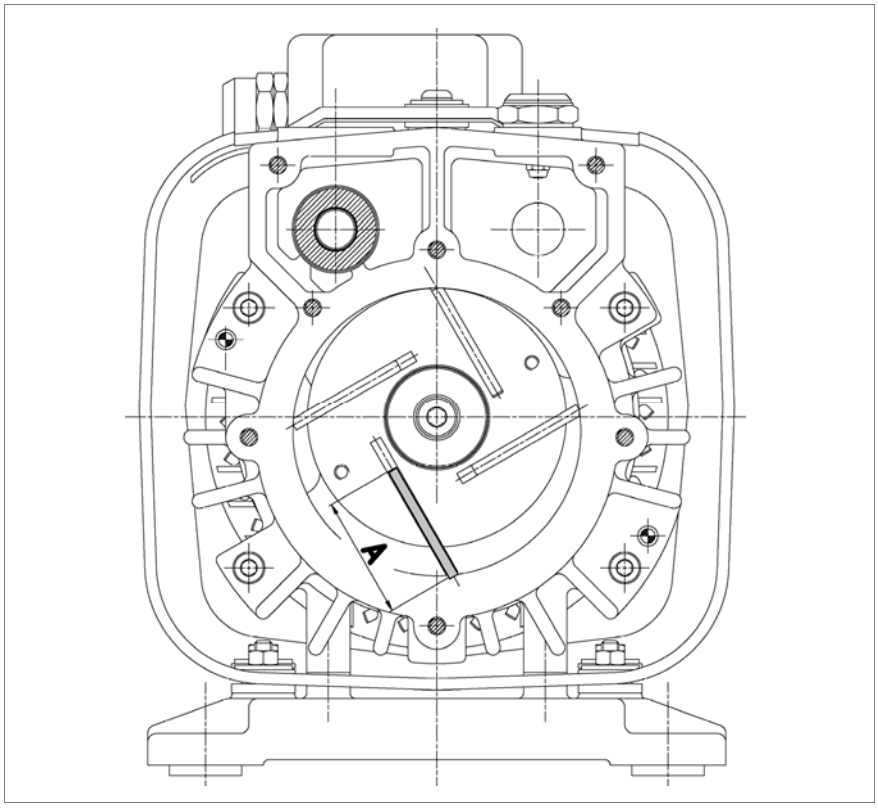

Figure 8 Disc thickness A

The following checking intervals should be adhered to:

D061 V – D141 V:

- First checking after 4,000 operating hours
  (ca. 12 months in double shift operation).
- Then every 1,000 operating hours
  (ca. 3 months in double shift operation).

Disc change:

NOTICE!

The discs may only be exchanged batchwise!

On reaching or falling below the minimum thickness A (see Table, page 20), the discs must be changed batchwise.

After removal of the discs, the housing and rotary slit must be blown clear. Then the new discs are inserted into the rotor slit.

Care should be taken that the insertion is in the correct structural position:

The slanting side of the disc must show to the outside and the slant in the rotation direction must coincide with the motion of the housing boring.

The housing lid and cover is then re-screwed in.

CAUTION!

Before start-up the free movement of the discs must be checked by turning the ventilator.
For this, the suction screen or protection cap should be unscrewed

10 Fault diagnosis

1. Pumping speed is insufficient:

Reason	Remedy
The inlet filter is dirty.	Clean the inlet filter or change it.
The pressure conduit is too long or too narrow.	Provide a larger diameter conduit, clear the restriction sites.
Leakage in the vacuum pump or in the system.	Check the pump and the pipes for pressure loss.
The discs are damaged.	Replace the discs.

2. Vacuum pump is turned off by circuit breaker:

Reason	Remedy
The grid tension/frequency does not conform to the motor data.	Conform to the motor data.
The motor protection switch is incorrectly set.	Check the setting of the motor protection switch.
The motor protection switch turns off too quickly.	Use a motor protection switch with an overload hanging switch-off component that takes account of the brief overload at the start (the model has a short-circuit- and overload correction component according to VDE 0660 Part 2 or IEC 947-4).
Connection at the motor circuit board or plug is incorrect.	Check the connections and/or plug.
The exhaust back pressure at the discharge is too high.	Check exhaust line and remove if necessary.

3. Final pressure (max. vacuum) is not reached:

Reason	Remedy
Leakage on the suction side of the vacuum pump or in the system.	Check the vacuum pump and the pipes for pressure loss.
The discs are worn or damaged.	Replace the discs.

4. Vacuum pump is too hot:

Reason	Remedy
The ambient- or suction temperature is too high.	The suction temperature must be between 5 °C and 40 °C.
The exhaust back pressure at the discharge is too high.	Check exhaust line and remove if necessary.
The cool air flow is hindered.	The cold air inlet and cold air outlet must be at least 10 cm distant from the nearest wall (exhaust cool air cannot be re-sucked in).

5. Vacuum pump makes unusual noise:

Reason	Remedy
The pump housing is worn out (chatter marks).	Obtain repairs from the manufacturer or contract workshop.
The vacuum regulation valve "vibrates" (if present).	Replace the valve.
The discs are damaged.	Replace the discs.

11 List of Figures